

What is claim d is:

1. A capacitative electromagnetic flow meter comprising:
 - a measurement tube made of insulating material through
5 which flows a fluid to be measured;
 - an exciting coil wound on a magnetic pole arranged
facing a periphery of said measurement tube, that supplies
flux in a direction orthogonal to a tube axis direction of
said measurement tube;
 - 10 a pair of face electrodes arranged facing a periphery of
an outer wall of said measurement tube in directions
respectively orthogonal to a direction of said flux and said
tube axis direction of said measurement tube;
 - guard electrodes arranged so as to cover said face
15 electrodes from said periphery of said outer wall,
maintaining a prescribed separation with said face
electrodes;
 - an exciting circuit that supplies an exciting current of
a frequency of at least a commercially available frequency
20 to said exciting coil;
 - a pre-amplifier that amplifies a detection signal
detected through an electrostatic capacitances between said
fluid to be measured and said pair of face electrodes,
respectively, and between said face electrodes and said
25 guard electrodes;

a cable whereby said face electrodes and guard electrodes are connected with said pre-amplifier;

a signal processing unit that outputs a flow rate of said fluid to be measured from an output signal of said pre-amplifier;

a cylindrical yoke forming a magnetic return circuit of an exciting magnetic field arranged coaxially with said measurement tube and so as to cover a periphery of said exciting coil;

a coil fixing plate of non-magnetic material electrically configured and fixed to said cylindrical yoke, covering said exciting coil; and

an earth ring provided at both ends of said measurement tube, whereby a metal pipe that is coaxially arranged with said cylindrical yoke and said cylindrical yoke are configured and fixed symmetrically and electrically connected with respect to an axis connecting centers of said pair of face electrodes and a tube axis of said measurement tube, at a periphery of said cylindrical yoke,

wherein said exciting circuit comprises filter means that controls a waveform of said exciting current such that an exciting flux waveform has a flat section; and

a value of an electrostatic capacitance formed between said face electrodes and said guard electrodes is smaller than a value of the electrostatic capacitance between said fluid to be measured and said face electrodes.

2. The capacitative electromagnetic flow meter according to claim 1,

wherein an epoxy resin is used to fill a space between
5 said measurement tube and said cylindrical yoke and a space between said measurement tube and said face electrodes and guard electrodes, respectively, and to fix said epoxy resin.

3. A capacitative electromagnetic flow meter comprising:
10 a measurement tube made of insulating material through which flows a fluid to be measured;

exciting means arranged facing a periphery of said measurement tube, that supplies flux in a direction orthogonal to a tube axis direction of said measurement
15 tube;

a pair of face electrodes arranged facing a periphery of an outer wall of said measurement tube in directions respectively orthogonal to a direction of said flux and said tube axis direction of said measurement tube;

20 guard electrodes arranged so as to cover said face electrodes from said periphery of said outer wall, maintaining a prescribed separation with said face electrodes;

an exciting circuit that supplies an exciting current of
25 a frequency of at least a commercially available frequency to said exciting coil;

a pre-amplifier that amplifies a detection signal detected through an electrostatic capacitances between said fluid to be measured and said pair of face electrodes, respectively, and between said face electrodes and said
5 respective guard electrodes;

a cable whereby said face electrodes and guard electrodes are connected with said pre-amplifier;

a signal processing unit that outputs a flow rate of said fluid to be measured from an output signal of said pre-
10 amplifier;

a cylindrical yoke forming a magnetic return circuit of an exciting magnetic field arranged coaxially with said measurement tube at a periphery of said exciting coil;

a coil fixing plate of non-magnetic material
15 electrically configured and fixed to said cylindrical yoke, fixing said exciting coil; and

an earth ring provided at both ends of said measurement tube, whereby a metal pipe that is coaxially arranged with said cylindrical yoke and said cylindrical yoke are
20 configured and fixed symmetrically and electrically connected with respect to an axis connecting centers of said pair of face electrodes and a tube axis of said measurement tube, at a periphery of said cylindrical yoke;

wherein said coil fixing plate and said cylindrical yoke
25 have both ends cut away in a direction of said tube axis, in a shape of a line where a central axial plane of a flux that

intersects orthogonally a center of said tube axis of said measurement tube intersects a periphery of said cylindrical yoke.

5 4. The capacitative electromagnetic flow meter according to claim 3,

 wherein said cutaway shape is adjusted by making a dimension in a direction of an axis joining centers of said pair of face electrodes a minimum and adjusting a dimension
10 in a tube axis direction of said measurement tube.

 5. The capacitative electromagnetic flow meter according to claim 3,

 wherein said pre-amplifier is inserted in a head between
15 a detection unit and signal processing unit and an interior of said detection unit that is surrounded by said measurement tube, and said metal pipe and said earth ring and an entire interior of said detection unit as far as said head is filled and fixed with an epoxy resin.

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 6. The capacitative electromagnetic flow meter according to claim 3,

 wherein a surface of said face electrodes and said guard electrodes is coated with a soft rubber and a space between
25 said measurement tube and said cylindrical yoke and a space

between said measurement tube and said face electrodes and guard electrodes are filled and fixed with an epoxy resin.

7. The capacitative electromagnetic flow meter according
5 to claim 6,
wherein, as said soft rubber, silicone resin is applied.